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Role of data quality in assessment of the sustainability of technologies

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Data quality is crucial for the reliability of sustainability assessments of technologies. In environmental life cycle assessment (LCA) of technologies, data representing the emissions and resource consumption associated with the production, use and disposal are collected and assessed in terms of potential environmental impacts. The life cycle inventory (LCI) is the compilation of the data used in an LCA, see Figure 1.

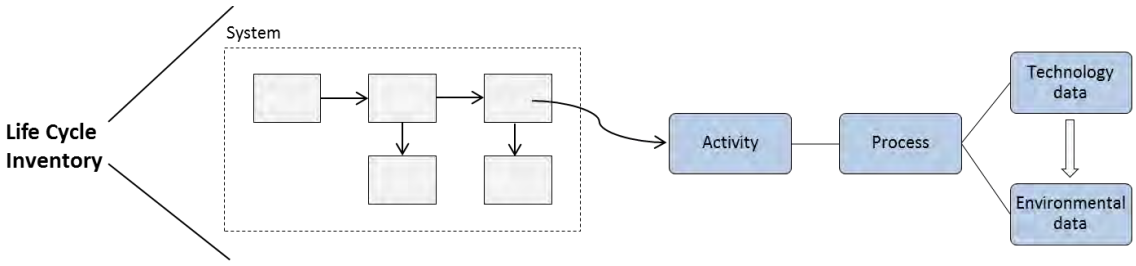

Figure 1 Structure of LCI data. Boxes within the studied system represent processes in the life cycle of a technology. Blue boxes show the data layers: Activity) Societal need to be fulfilled; Process) Industrial step in the system; Technology data) Exchanges of economic goods between processes, Environmental data) Environmental exchanges caused by the economic exchanges.

Each of the grey boxes (processes) in Figure 1 expresses data choices made by the modeller. One important indicator of the quality of the chosen data is its technological, geographical and temporal accuracy, i.e. the data must represent the technologies being studied. However, in cases of lack of knowledge or lack of appropriate data the modeller may choose to use non-accurate data instead (Laurent et al., 2014).

In LCAs, different single technologies are compared or one specific technology is benchmarked against a group's average (JRC, 2010). Comparisons can include emerging, state-of-art, current and old technologies leading to data quality issues due to different availability of data for new or emerging versus current or old technologies. The use of non-accurate data may give wrong conclusions and unreliable results, why the choice of data is crucial for the relevance and reliability of sustainability assessments.

A case study of landfill technologies is being used as an example of an analysis of the influence of data choices on an LCA. Data for state-of-the-art, current and old technologies are combined in one model to show the maximum range of results that can be obtained based on the choice of data. The preliminary results of the case study will be presented at the Sustain DTU Conference.

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